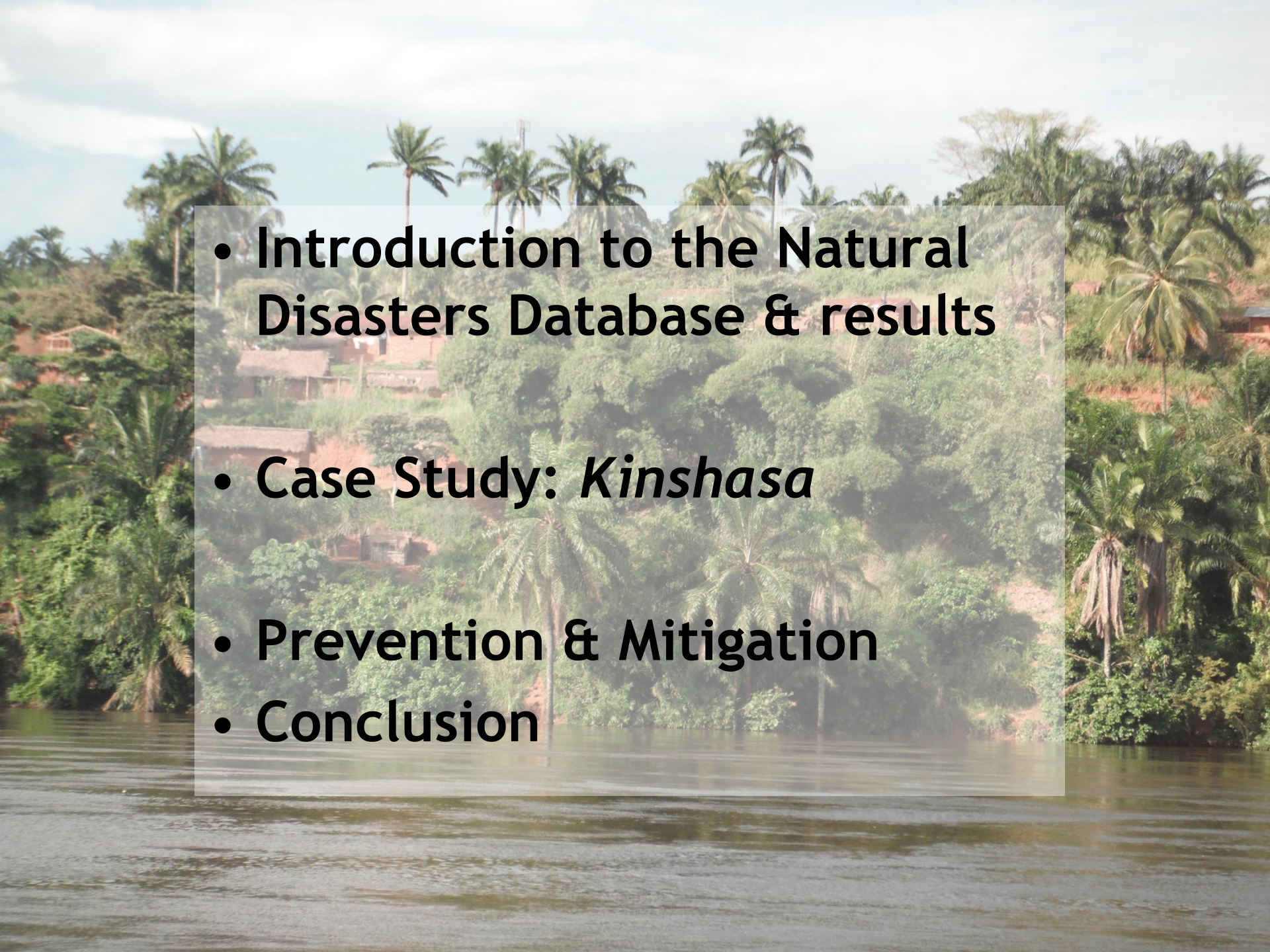


# The Increasing Threat of Natural Hazards in Central Africa: The Case of Urban Megagullies

Vandecasteele I, Makanzu F, Ntombi A, Jan Ozer P, Moeyersons J, Trefois Ph,

- Royal Museum for Central Africa, Tervuren, Belgium
- Centre de Recherche Geologique et Miniere, Kinshasa, RDCongo
- University of Liege, Belgium

- 
- Introduction to the Natural Disasters Database & results
  - Case Study: *Kinshasa*
  - Prevention & Mitigation
  - Conclusion

# INTRODUCTION



Why a database??

Importance

- High frequency smaller events = great cumulative impact
- Large events - eg. flooding Congo river 1940-41; 1960-61

Public Awareness!!

- Research
- Hazard mapping...

Flooding in Ubundu (Tshopo, DRC), 1940s.  
Source: Posted on Google Earth

# Natural Hazards

## Extraterrestrial

Meteorite impact  
Ice ages

## Biological

Epidemic  
Insect Infestation

## Climatological/ Meteorological

Extreme temperature  
Drought  
Storms

## Geomorphological

## Geophysical

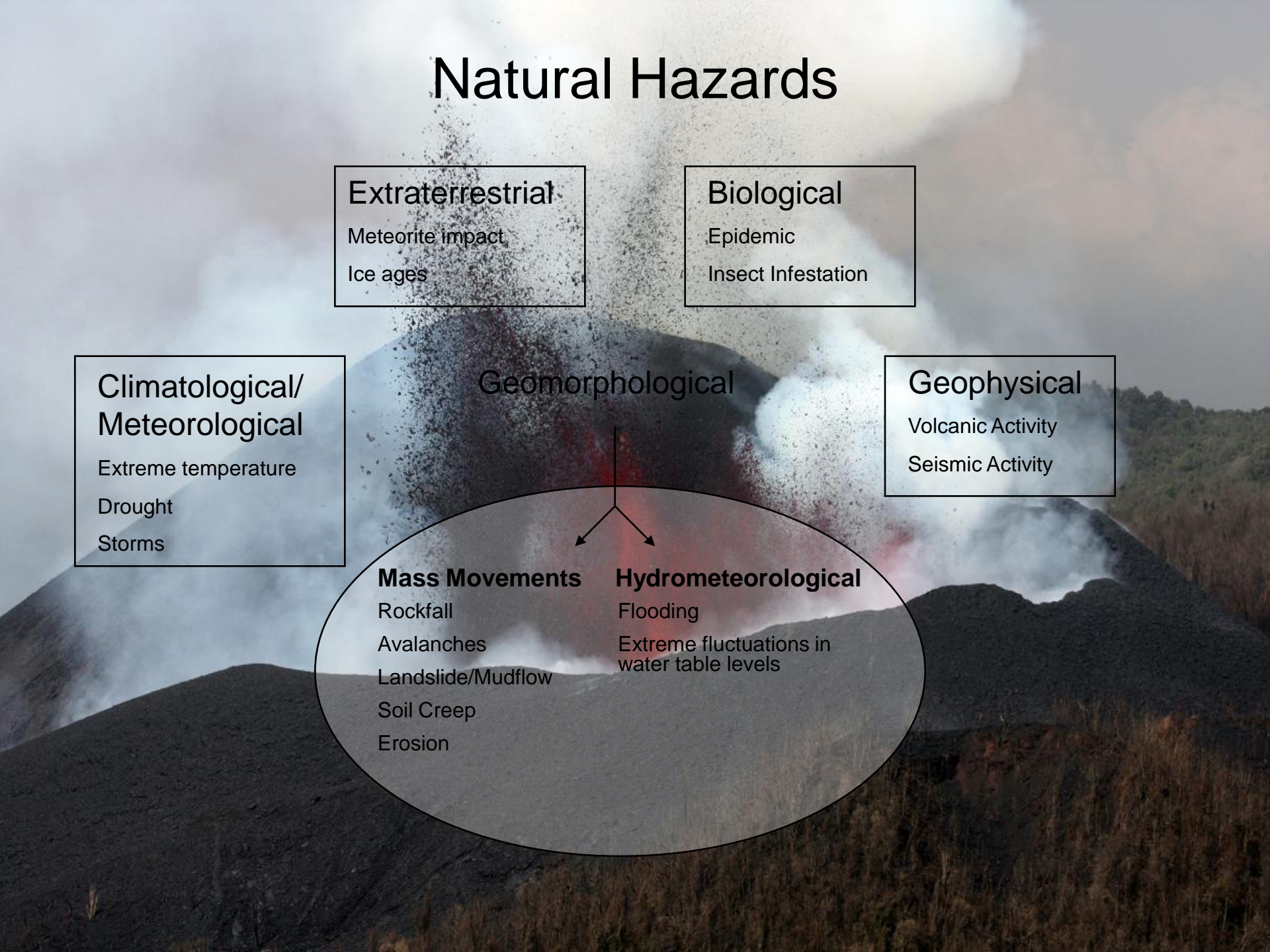
Volcanic Activity  
Seismic Activity

### Mass Movements

Rockfall  
Avalanches  
Landslide/Mudflow  
Soil Creep  
Erosion

### Hydrometeorological

Flooding  
Extreme fluctuations in  
water table levels



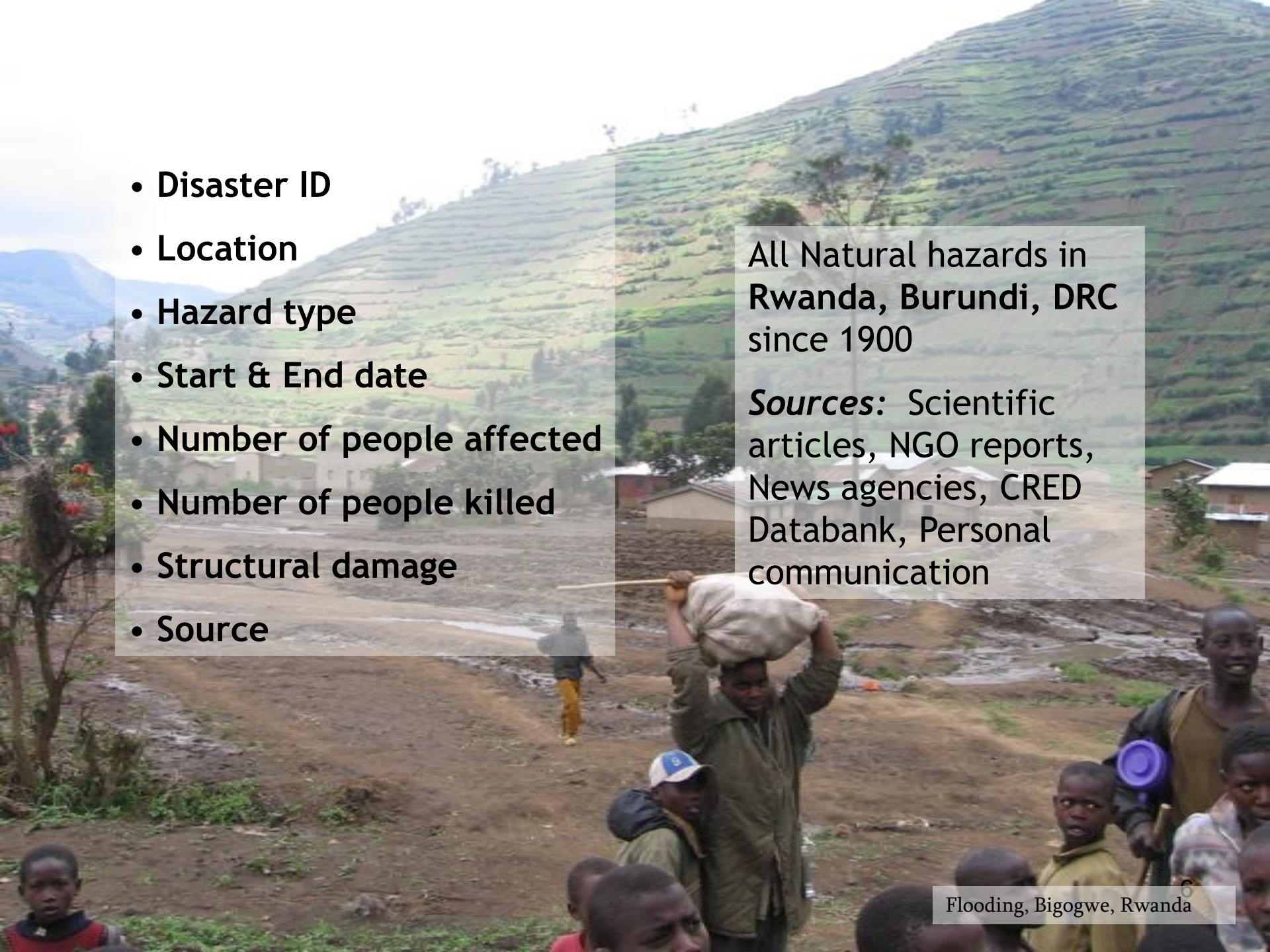
An aerial photograph showing a large landslide in a hilly, green landscape. The landslide is a large, exposed area of reddish-brown soil and rock, with a path leading down from the top. In the background, there is a village with several houses and a road. The sky is overcast.

## Natural Factors

- Topography
- Lithology and soil type
- Precipitation & river regime
- Tectonic activity

## Anthropogenic Factors

- Land use
- Urbanisation
- Deforestation

- 
- Disaster ID
  - Location
  - Hazard type
  - Start & End date
  - Number of people affected
  - Number of people killed
  - Structural damage
  - Source

All Natural hazards in  
Rwanda, Burundi, DRC  
since 1900

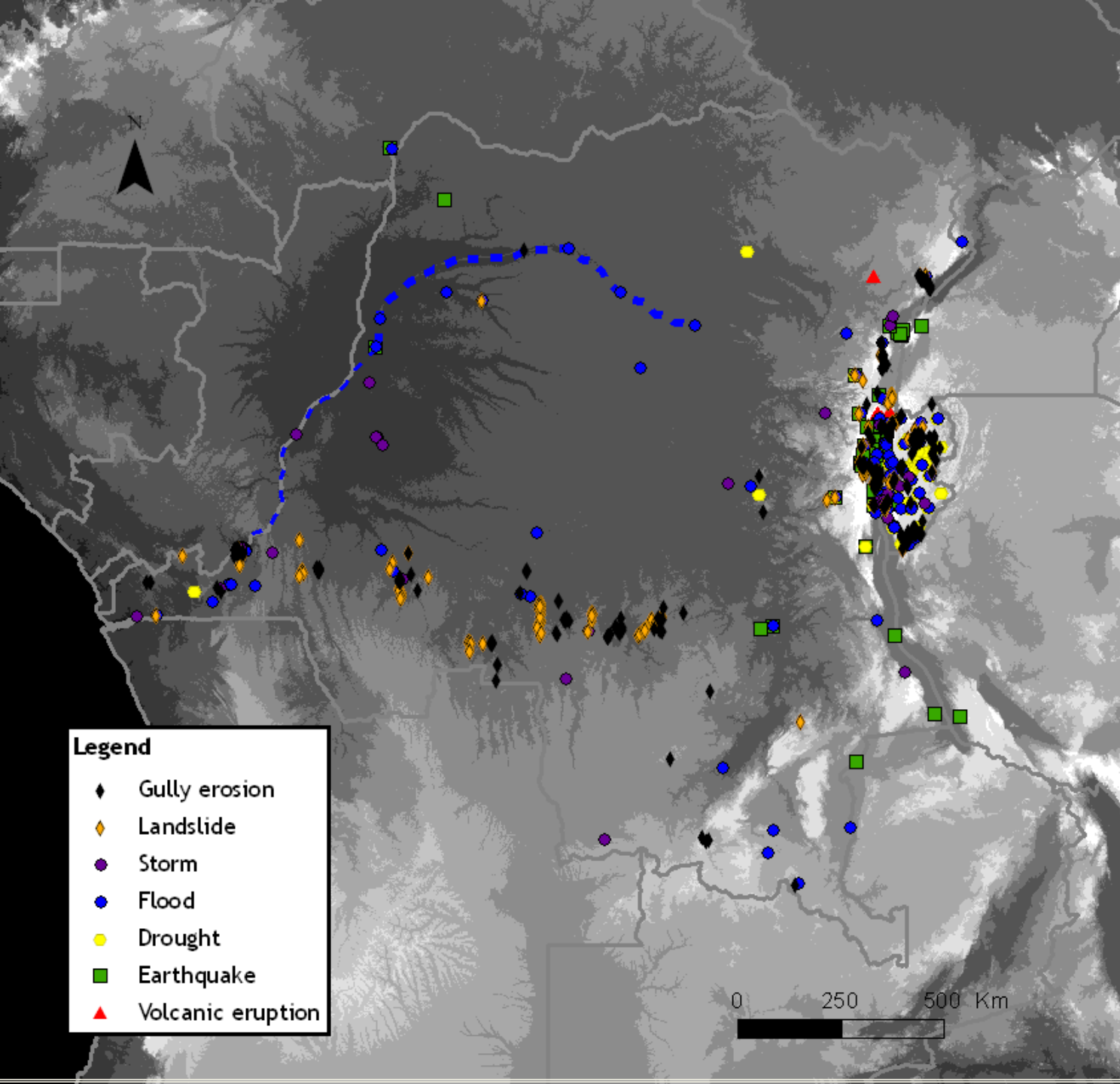
*Sources:* Scientific  
articles, NGO reports,  
News agencies, CRED  
Databank, Personal  
communication

# RESULTS

Since 1900: 730 recorded events  
>12.2 million people affected  
~ 2000 deaths



Landslide in Kilimani Refugee Camp, Masisi (North Kivu, DRC) 4 February 2009; 3 injured, 8 killed, dozens of houses destroyed  
Source: Doctors without borders, Reliefweb



**Legend**

- ◆ Gully erosion
- ◇ Landslide
- Storm
- Flood
- Drought
- Earthquake
- ▲ Volcanic eruption

**Volcanic Activity**

Virunga Range

**Seismic Activity**

Albertine Rift

**Droughts**

Burundi, Southern Rwanda

**Floods**

Concentration in Rwanda, Burundi & major cities

**Storms**

Tropical zone

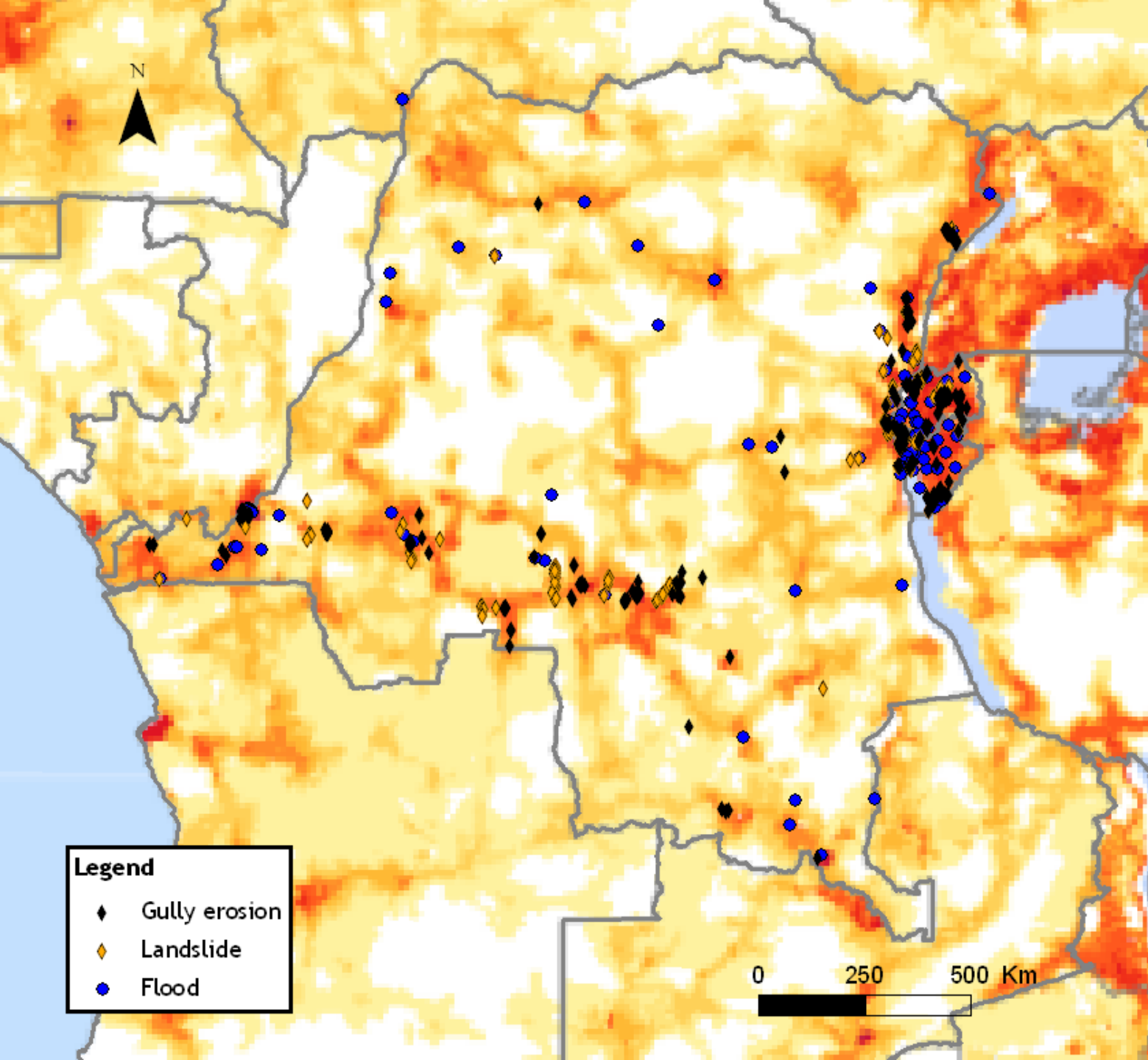
**Landslides**

~ topography, land use

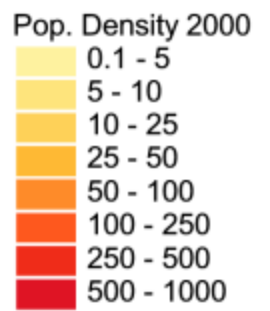
**Gully erosion**

~ topography, land use





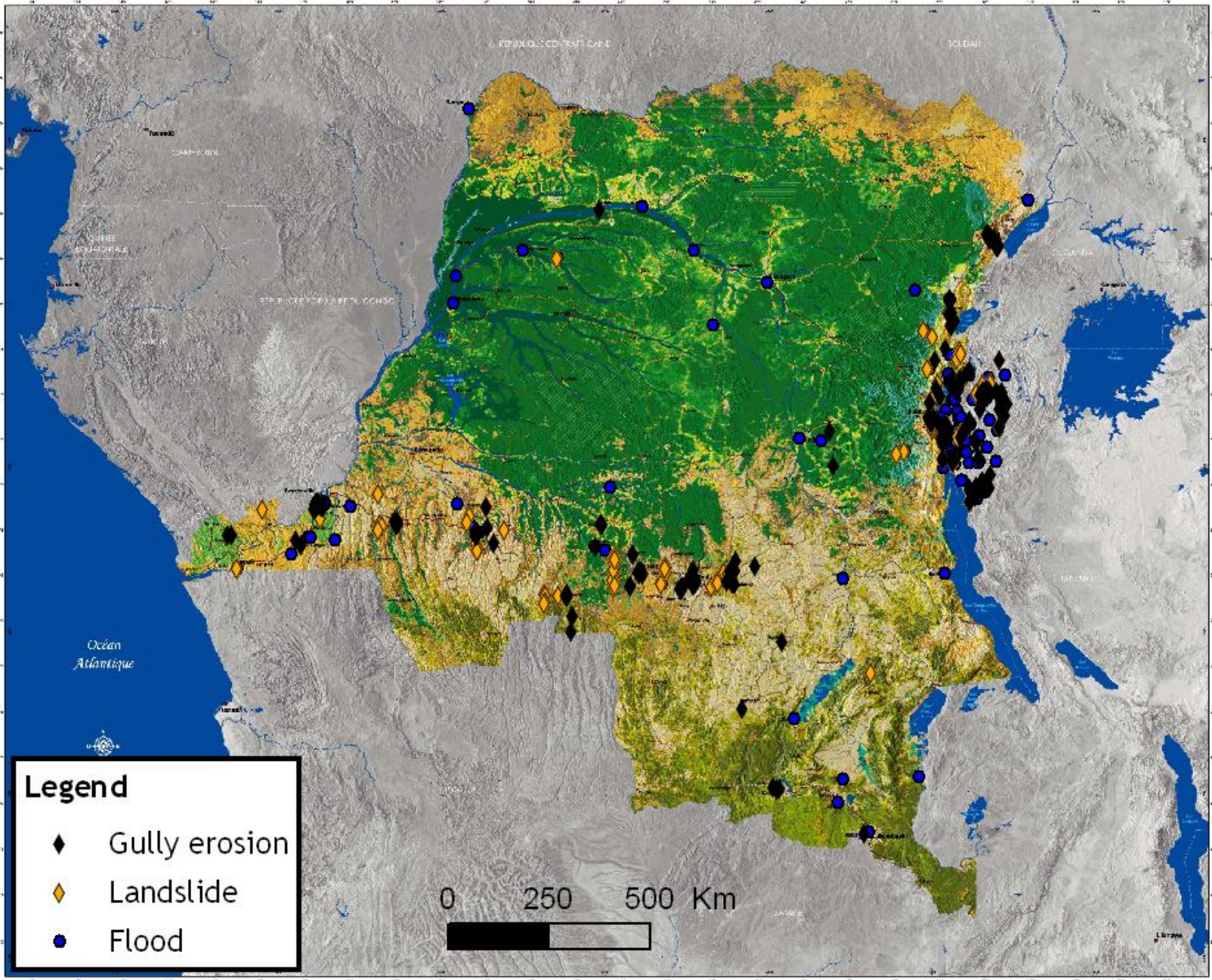
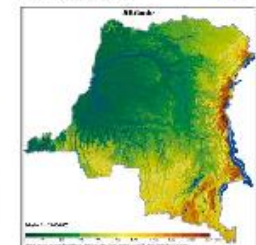
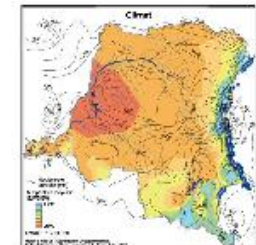
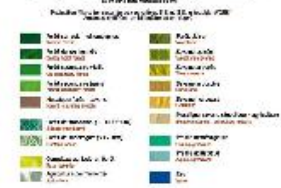
# Population Density



# République Démocratique du Congo

OCCUPATION DU SOL

1:3 000 000



**Legend**

- ◆ Gully erosion
- ◆ Landslide
- Flood

Land Use

# The Natural Hazards Database ONLINE:



HOME

VISITING

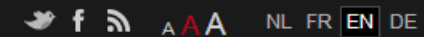
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11	12	13	14	15	16	17

## Natural Hazards Database in Central Africa

[Search](#) | [About the database](#) | [Practical guide](#) | [Contact](#)

### Search

Welcome to the *Natural Hazards Databank for Central Africa*! We provide up-to-date and as complete as possible information on natural hazards having occurred in Rwanda, Burundi and the Democratic Republic of Congo since 1900.

This databank is a work in progress, and does not claim to be an exhaustive list. If there are any errors in the data provided, or if you have information you wish to share on events not yet included in the databank, please do not hesitate to contact us, your name will of course be added as a source of information.

Hazard type :

Country :

Province :

Year :  (ex: 1956)    Period :  years

Keywords :

Search

217 results matching your criteria

Hazard type :

Country :

Province :

Year :

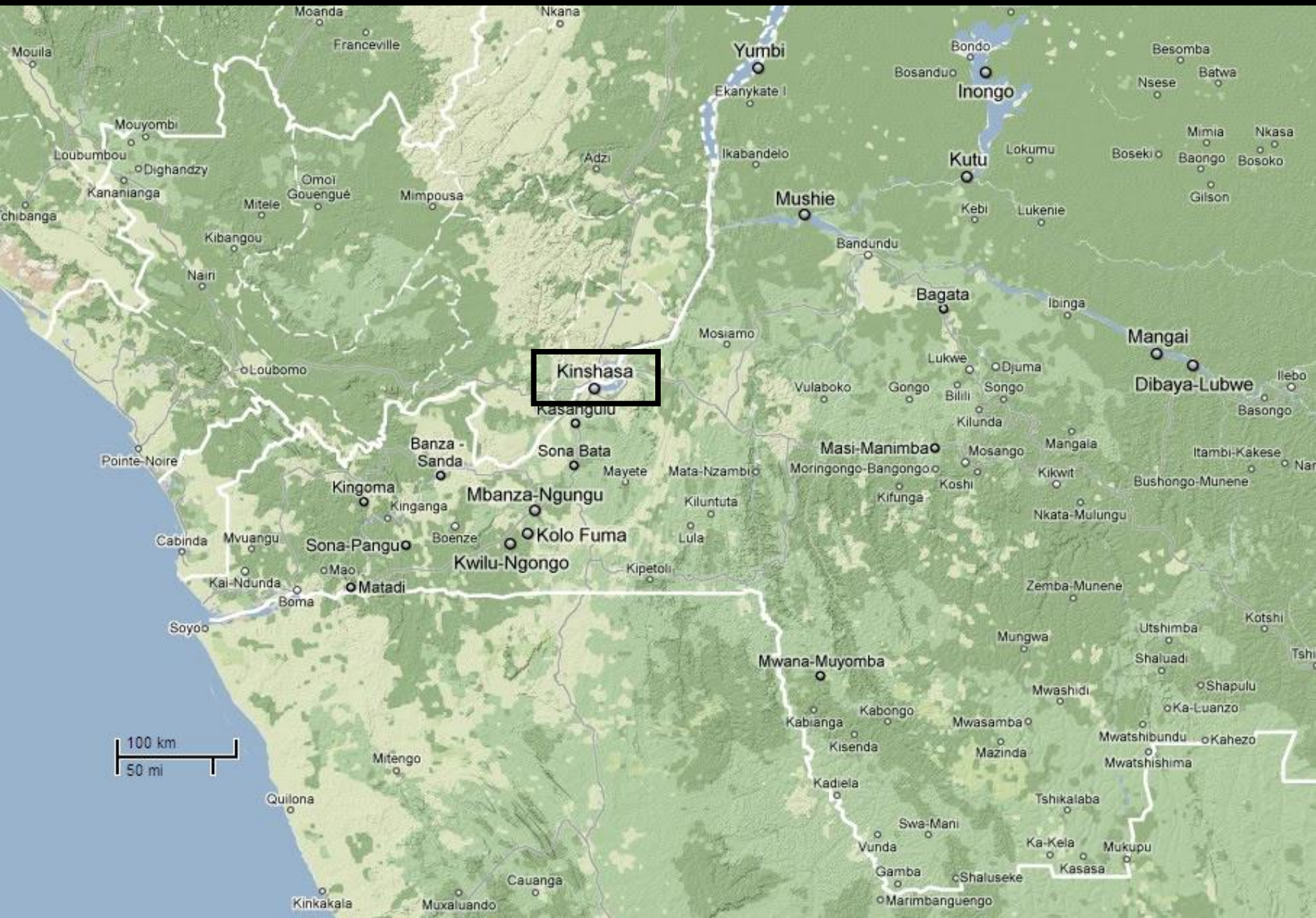
Keywords :

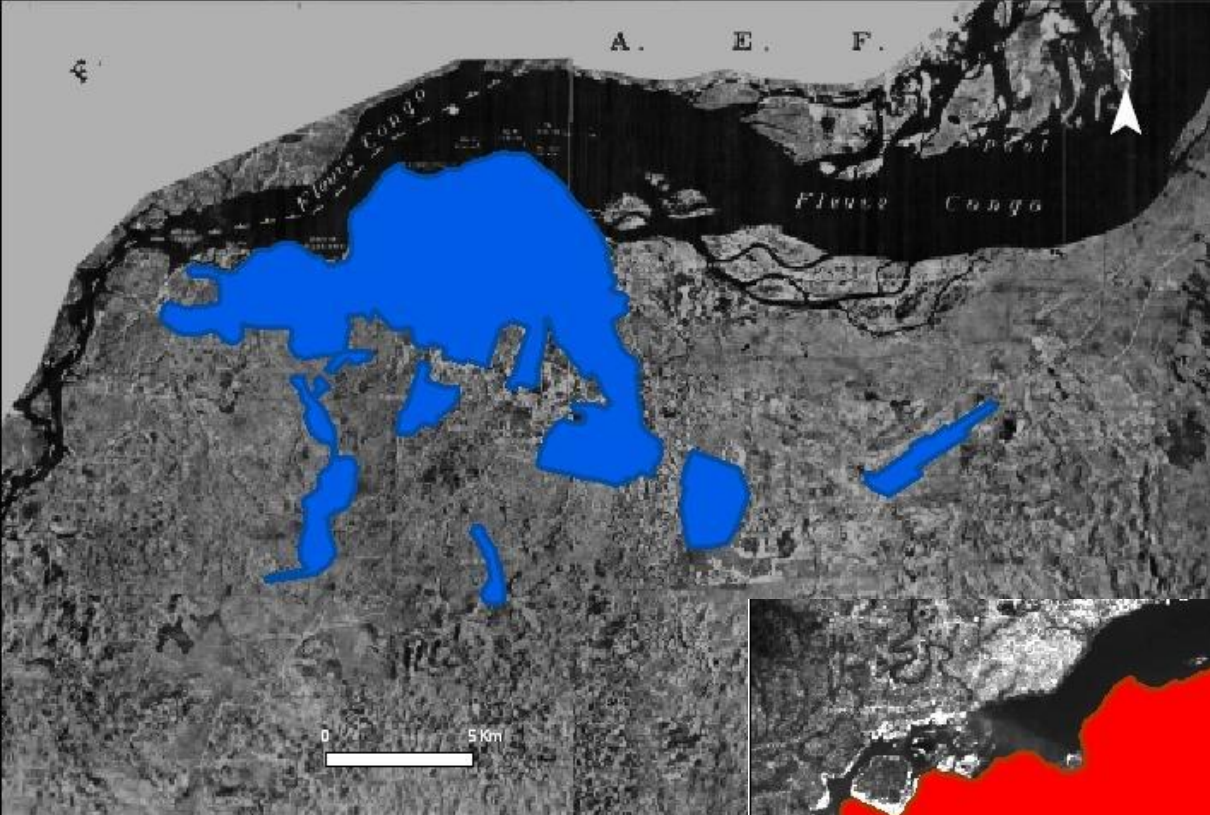
Period :  years



Disaster ID	Hazard	Country	Province	Location	Begin date	End date	Persons affected	Persons killed
<a href="#">1962 A BDI</a>	Flood	Burundi	Bujumbura Ville	Bujumbura	1962	1962		
<a href="#">1989 32 BDI</a>	Flood	Burundi	Bujumbura Ville	Bujumbura	1989/2/2	1989/2/2	3600	12
<a href="#">2002 275 BDI</a>	Flood	Burundi	Bujumbura Rural	Bujumbura	2002/5/6	2002/5/6	6000	
<a href="#">2002 275 BDI</a>	Flood	Burundi	Bujumbura	Buiumbura	2002/5/6	2002/5/6	6000	

# CASE STUDY: “Megagullies” in KINSHASA

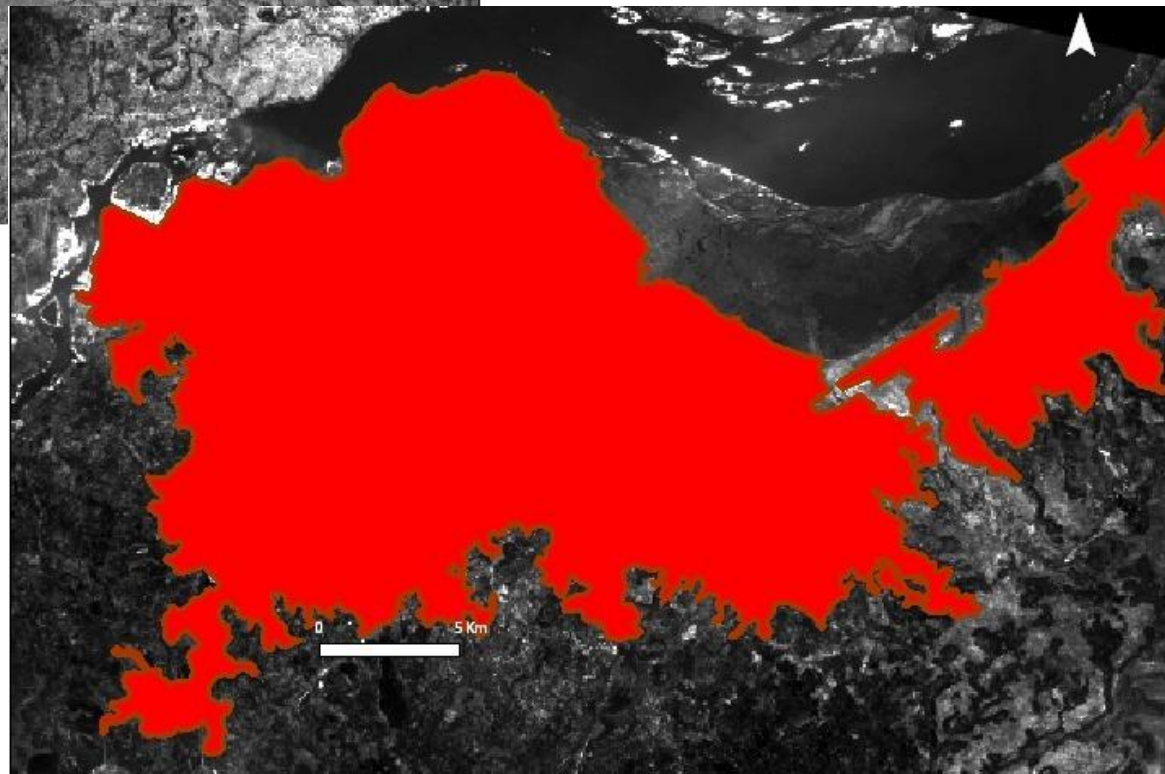




**1957**

94,2 km<sup>2</sup>

299 800 hab.

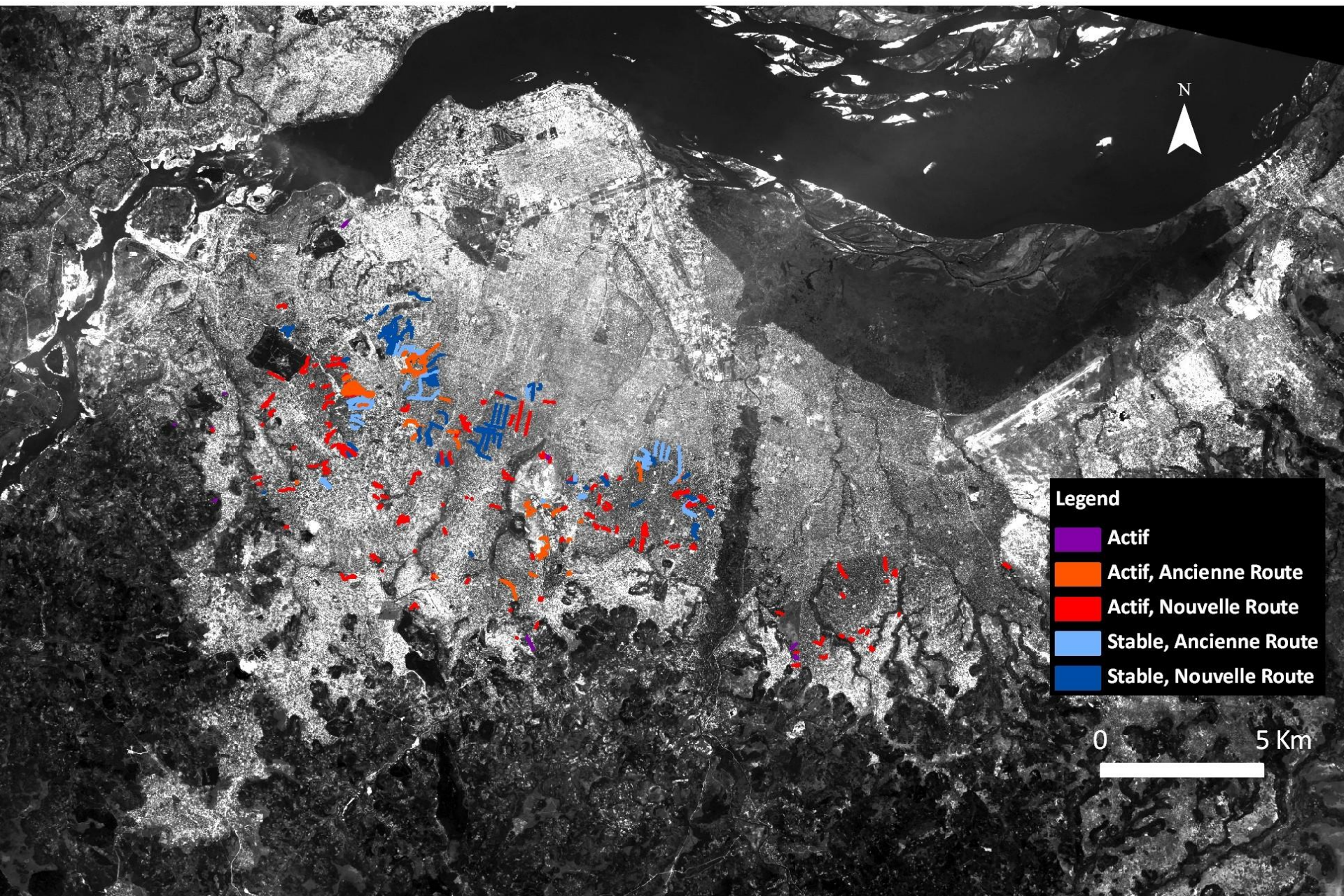


**2007**

442,7 km<sup>2</sup>

7 500 000 hab.

Urban extent of Kinshasa 1957-2007



Gully erosion in Kinshasa 2007



**307 gullies** - 209 active & 98 'stabilised'

Average width 22,5 m; depth 8 m

**94,5 km** total length

(almost Johannesburg to Rustenburg!)

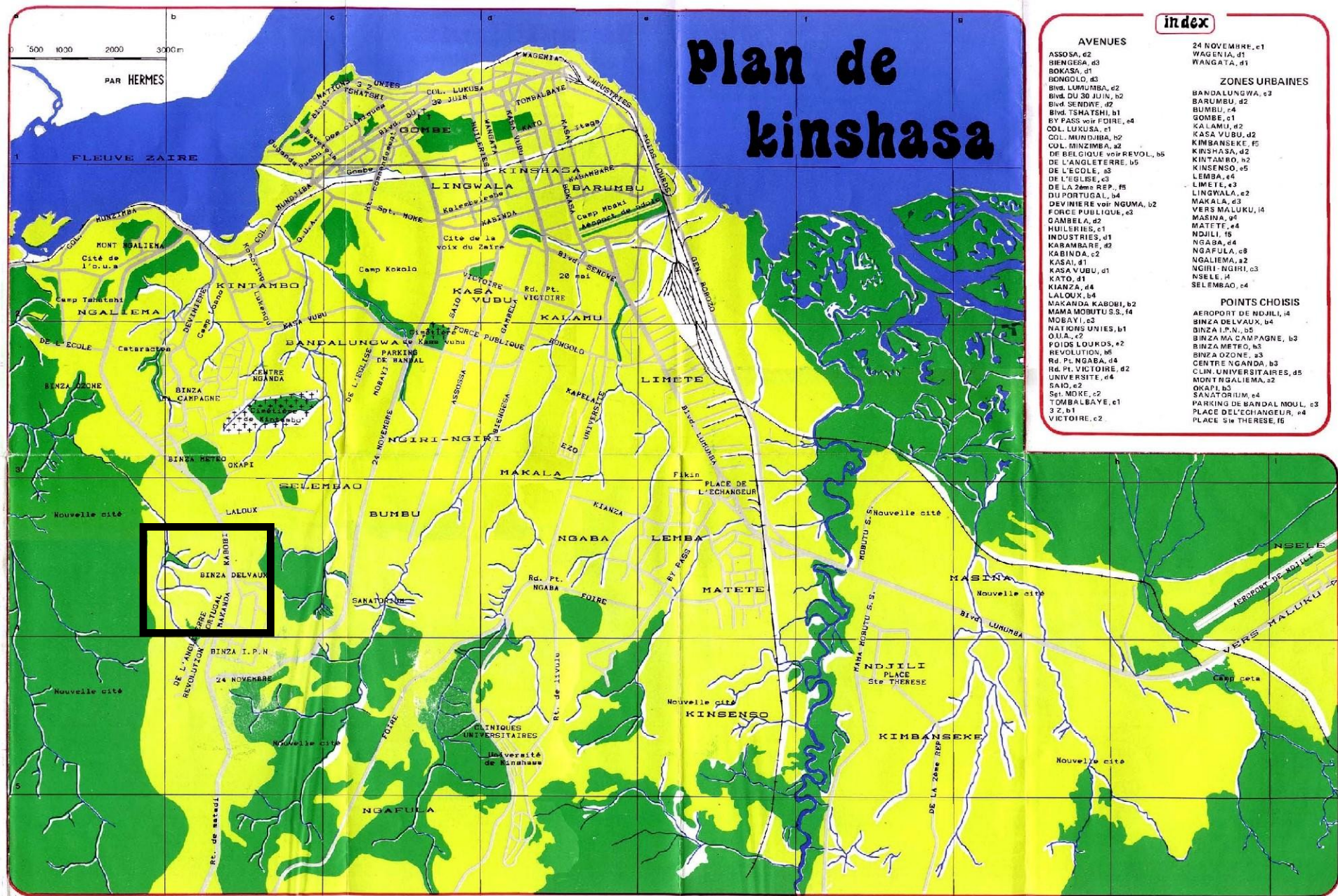
**2 km<sup>2</sup>** total surface area lost

(Monaco!)





Since 1957, an estimated 4725 houses have been destroyed:  
= over **\$ 60 million** in property losses alone!



• Ravins Mataba I & II, Quartier Binza Delvaux



Mataba I gully, Binza Delvaux, Kinshasa



Mataba I gully, Binza Delvaux, Kinshasa